
Pyrolytic graphite foam: a passive magnetic susceptibility matching material.

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Authors:	Gary C Lee, Patrick W Goodwill, Kevin Phuong, Ben A Inglis, Greig C Scott, Brian A Hargreaves, Lizabeth Li, Alex C Chen, Rachana N Shah, Steven M Conolly
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Public Summary:

PURPOSE: To evaluate a novel soft, lightweight cushion that can match the magnetic susceptibility of human tissue. The magnetic susceptibility difference between air and tissue produces field inhomogeneities in the B(0) field, which leads to susceptibility artifacts in magnetic resonance imaging (MRI) studies. MATERIALS AND METHODS: Pyrolytic graphite (PG) microparticles were uniformly embedded into a foam cushion to reduce or eliminate field inhomogeneities at accessible air and tissue interfaces. 3T MR images and field maps of an air/water/PG foam phantom were acquired. Q measurements on a 4T tuned head coil and pulse sequence heating tests at 3T were also performed. RESULTS: The PG foam improved susceptibility matching, reduced the field perturbations in phantoms, does not heat, and is nonconductive. CONCLUSION: The susceptibility matched PG foam is lightweight, safe for patient use, adds no noise or MRI artifacts, is compatible with radiofrequency coil arrays, and improves B(0) homogeneity, which enables more robust MR studies.

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